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HAWKS AND OWLS FROM THE STANDPOINT  
OF THE FARMER.

BY

A. K. FISHER, M. D.,

*Assistant Ornithologist, U. S. Department of Agriculture.*

[Reprinted from the Yearbook of the U. S. Department of Agriculture for 1894.]



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## HAWKS AND OWLS AS RELATED TO THE FARMER.

By A. K. FISHER, M. D.,

*Assistant Ornithologist, U. S. Department of Agriculture.*

### CAUSE OF THE PREJUDICE AGAINST BIRDS OF PREY.

The old saying that "a little knowledge is a dangerous thing" is exemplified in the way our hawks and owls are looked upon by a large majority of mankind. The farmer sees a hawk strike a fowl which has wandered from the farmyard; the sportsman, while planning the capture of a covey of quail, finds the mutilated remains of a game bird and feels sure it is the unlawful prey of a thieving owl—without further investigation both men condemn birds of prey as a class, and lose no opportunity to destroy them and their eggs and young.

The ill feeling has become so deep rooted that it is instinctive even in those who have never seen any depredations. How are we to account for this hatred against birds of prey by the class of men who should be the first to clamor for their protection? The prejudice is largely due to lack of discrimination. Since they know that hawks and owls attack poultry, they do not stop to think that these depredations may be made by a few species only, but make a sweeping condemnation of the whole family. The reasoning is much the same as that of an Indian or frontiersman, who, being wronged by one individual, condemns a whole race. It would be just as rational to take the standard for the human race from highwaymen and pirates as to judge all hawks by the deeds of a few. Even when the industrious hawks are observed beating tirelessly back and forth over the harvest fields and meadows, or the owls are seen at dusk flying silently about the nurseries and orchards, busily engaged in hunting the voracious rodents which destroy alike the grain, produce, young trees, and eggs of birds, the curses of the majority of farmers and sportsmen go with them, and their total extinction would be welcomed. How often are the services rendered to man misunderstood through ignorance! The birds of prey, the majority of which labor day and night to destroy the enemies of the husbandman, are persecuted unceasingly, while that gigantic fraud—the house cat—is petted and fed and given a secure shelter from which it may emerge in the evening to spread destruction among the feathered tribe. The difference between the two can be summed up in a few words—only three or four birds of prey hunt birds when they can procure rodents for



food, while a cat seldom touches mice if she can procure birds or young poultry. A cat has been known to kill 20 young chickens in a day, which is more than most raptorial birds destroy in a lifetime.

It is to be lamented that the members of the legislative committees who draft the game laws of various States have not a better knowledge of the life histories of raptorial birds. It is surprising also that gun clubs should be so far behind the times as to offer prizes to those who kill the greatest number of birds of prey; for in clubs of any importance, there must be naturalists whose counsel ought to prevent such barbarity. That the beneficial species of hawks and owls will eventually be protected there is not the slightest doubt, for when the farmer is convinced that they are his friends he will demand their protection; and already the leading agricultural papers and sportsman's journals are deprecating their indiscriminate slaughter.

#### SOME CHARACTERISTICS OF RAPACIOUS BIRDS.

The rapacious birds are slow breeders, rearing only one brood a year, though of course if the first set of eggs is destroyed another will be deposited. The young grow slowly and need a relatively large amount of food to develop properly. To satisfy their enormous appetite requires constant foraging on the part of the parents, and the strain of bringing up the family is probably twice that of any of the other land birds. Even the adults are large eaters, gorging to the utmost when the opportunity presents; and as digestion is very rapid and assimilation perfect, a great quantity of food in relation to the body weight is consumed each day. Taking more food than necessary for immediate wants enables them to store up force for future emergencies, for they are often required to withstand great exposure and long-protracted fasts, especially during inclement weather.

Hawks and owls are complementary to each other. While hawks hunt by day and keep diurnal mammals in check, owls, whose eyesight is keenest during twilight and the early hours before dawn, capture nocturnal species which the former is not apt to obtain. Again, the owls are less migratory than the hawks, and during the long winter nights they remain in the land of ice and snow to wage incessant warfare against the little enemies of the orchard, garden, and harvest fields.

Although much may be learned about the food from observing the habits of the live birds, the only way to find out the full range and relative percentages of the food elements is by examination of the stomach contents. Sometimes, in the case of birds of prey, a moderately complete and reliable index to the food can be obtained by examining the "pellets." Hawks and owls often swallow their smaller victims entire and tear the larger ones into several pieces, swallowing each fragment as it is detached. After the nutritious portion of the food has been absorbed, the indigestible parts, such as hair, feathers, scales, bones, and other hard parts, are rolled into a solid ball by the

action of the muscles of the stomach. These masses, known as "pellets" are regurgitated before fresh food is taken. The movements of the stomach so shape the "pellets" that the sharp pieces of bone which might otherwise injure the mucous membrane are carefully enveloped in a felty covering of hair or feathers. The pellets contain everything necessary to identify the food, and in the case of some of the owls which have regular roosting places the vast number of pellets that collect underneath give an almost perfect record of the results of their hunting excursions.

#### FOOD HABITS OF THE PRINCIPAL BIRDS OF PREY.

It is the object of the present paper to review more or less briefly the food habits of the principal birds of prey of the United States, so that those who are most interested in the subject may be able to distinguish between enemies and friends, and hence be saved the humiliation of wronging the latter while endeavoring to destroy the former.

Hawks and owls may be divided arbitrarily into four classes, according to their beneficial and harmful qualities:

- (1) Species which are wholly beneficial.
- (2) Those chiefly beneficial.
- (3) Those in which the beneficial and harmful qualities about balance.
- (4) Harmful species.

It should be stated here that several of the species may belong to one or another class according to the locality they frequent. A hawk or owl may be locally injurious because at that place mice, squirrels, insects, and other noxious animals are scarce, and consequently the bird has to feed on things of more or less value to man, while in other regions where its favorite food is obtainable in sufficient quantity it does absolutely no harm. A good example of this kind is given under the head of the great horned owl in a subsequent part of this paper.

To the wholly beneficial class belong the large rough-legged hawk, its near relative, the squirrel hawk or ferruginous roughleg, and the four kites—the white-tailed kite, Mississippi kite, swallow-tailed kite, and everglade kite.

The chiefly beneficial class contains a majority of the hawks and owls, and includes the following species and their races: Marsh hawk, Harris's hawk, red-tailed hawk, red-shouldered hawk, short-tailed hawk, white-tailed hawk, Swainson's hawk, short-winged hawk, broad-winged hawk, Mexican black hawk, Mexican goshawk, sparrow hawk, Audubon's caracara, barn owl, long-eared owl, short-eared owl, great gray owl, barred owl, western owl, Richardson's owl, Acadian owl, screech owl, flammulated screech owl, snowy owl, hawk owl, burrowing owl, pygmy owl, ferruginous pygmy owl, and elf owl.

The class in which the harmful and beneficial qualities balance includes the golden eagle, bald eagle, pigeon hawk, Richardson's hawk, Aplomado falcon, prairie falcon, and great horned owl.

The harmful class comprises the gyrfalcons, duck hawk, sharp-shinned hawk, Cooper's hawk, and goshawk.

#### HARMLESS SPECIES OF HAWKS AND OWLS.

We will now take up each class and examine the species more or less in detail so as to show briefly the character of the food. The harmless species include the four kites, which, if not as beneficial as some of the hawks, are at least perfectly harmless. The *everglade kite* is found within our borders in Florida only, where it is restricted to the middle and southern portions. It feeds exclusively on a large fresh-water snail,



FIG. 21.—Swainson's Hawk (*Buteo swainsoni*).

which abounds in the shallow lakes and overflowed sections grown up with grass and other herbage. The swallow-tailed, Mississippi, and white-tailed kites feed largely upon reptiles and insects, and never as far as known attack birds. The *swallow-tailed* is reported as feeding quite extensively on the cotton worm during the summer and early fall. If this is a common habit, it brings the bird at once into prominence as of economic importance and of great value to the Southern planter. The *Mississippi kite* and its white-tailed ally devour large numbers of lizards, small snakes, and insects; of the latter, grasshoppers and beetles are most frequently taken.

## WHOLLY BENEFICIAL HAWKS.

The *rough-legged hawk*, and the *ferruginous roughleg*, or *squirrel hawk*, as it is sometimes called on account of its great fondness for the ground squirrels so destructive in the West, are among our largest and at the same time the most beneficial hawks. The former breeds wholly north of the United States, migrating south in September and October and remaining until the following April. The latter breeds extensively through the Great Plains region. The winter range of the roughleg is determined more by the fall of snow than by the intensity of cold, the main body advancing and retreating as the barrier of snow melts or accumulates. Meadow mice and lemmings form the staple food of this bird. In this country the lemmings do not reach our territory except in Alaska, but in the north of Europe they occasionally form into vast, migrating, devastating hordes which carry destruction to all crops in the country passed over. The vole, or meadow mouse, is common in many parts of this country, and is, east of the Mississippi River, without doubt, the most destructive mammal to agriculture. It destroys meadows by tunneling under them and eating the roots of grass. In many meadows the runways form networks which extend in every direction, giving an idea of the animal's abundance. This mouse also destroys grain and various kinds of vegetables, especially tubers, but probably does even more damage by girdling young fruit trees. In 1892 considerable areas in southeastern Scotland were overrun by meadow mice and a large amount of property was destroyed during the "vole plague." Just such invasions might be expected in any country where predaceous mammals and birds are reduced to a minimum in the supposed interest of game preservation. This wholly upsets nature's balance, and the injurious rodents are left practically without an enemy to control their increase. We have little reason, however, to exult over the older country, for in many portions of the United States the people, if they had the power, would follow the same shortsighted policy, causing inestimable damage to the agriculturist. Attempts have been made in some States to reduce the number of hawks and owls by offering bounties for their heads, but fortunately the work has not been carried far enough to do the harm that has been done by the long-continued efforts of gamekeepers in Great Britain.

The *roughleg* is one of man's most important allies against meadow mice, feeding on little else during its six months' sojourn in the United States. It thus renders important service in checking the ravages of these small but formidable pests. The roughleg is somewhat crepuscular in habits, being on the alert during twilight and early dawn, when small mammals are most active. Other mice, rabbits, and ground-squirrels are taken occasionally, and some of the older writers state that waterfowl are captured by this bird. The writer has made careful inquiries of a considerable number of persons who have had extensive

field experience where these birds are common and in no instance has he heard of their attacking birds. Even better evidence is found in the fact that stomachs of specimens shot in locations teeming with water-fowl contained nothing but the remains of meadow mice.

The *ferruginous roughleg* is as fully beneficial as its relative, though the character of its food differs somewhat. In many parts of the country inhabited by it, the meadow mice which play such an important part in the economy of the other bird are scarce or wanting, but are replaced by nearly as destructive rodents, the ground squirrels. Upon these this large and handsome hawk wages a continuous warfare, and great is the service it performs in keeping their numbers in check. Rabbits, prairie dogs, and occasionally pouched gophers are eaten. It is humiliating to think how many of these two noble hawks are ruthlessly murdered, and to reflect that legislators put bounties on their heads to satisfy the ignorant prejudices of their constituents.

#### HAWKS AND OWLS MOSTLY BENEFICIAL.

Nearly two-thirds of the birds of prey inhabiting the United States belong in the second class, which comprises such hawks and owls as are mainly beneficial. A few of the most useful and well-known species will be considered in detail.

The *marsh hawk* is one of the most valuable in the class on account of its abundance, wide distribution, and peculiar habits. It is more or less common throughout the United States and may be easily recognized by its white rump, slender form, and long, narrow wings, as it beats untiringly over the meadows, marshes, and prairie lands in search of food. If it were not that it occasionally pounces upon small birds, game, and poultry, its place in the first class would be insured, for it is an indefatigable mouser. Rodents, such as meadow mice, rabbits, arboreal squirrels, and ground squirrels, are its favorite quarry. In parts of the West the latter animals form its chief sustenance. Lizards, snakes, frogs, and birds are also taken. Among the birds most often captured are the smaller ground-dwelling sparrows, of least use to the farmer.

From its abundance, wide distribution, and striking appearance, the *red-tailed hawk* is probably the best known of all the larger hawks. Since it is handicapped by the misleading name "hen hawk," its habits should be carefully examined. There is no denying that both it and the *red-shouldered hawk*, also known as "hen hawk," do occasionally eat poultry, but the quantity is so small in comparison with the vast numbers of destructive rodents consumed that it is hardly worth mentioning. While fully 66 per cent of the red-tail's food consists of injurious mammals, not more than 7 per cent consists of poultry, and it is probable that a large proportion of the poultry and game captured by it and the other buzzard hawks is made up of old, diseased, or otherwise disabled fowls. It is well known to poulterers and owners of game

preserves that killing off the diseased and enfeebled birds, and so preventing their interbreeding with the sound stock, keeps the yard and coveys in good condition and hinders the spread of fatal epidemics. It seems, therefore, that the birds of prey which catch aged, frost-bitten, and diseased poultry, together with wounded and crippled game, are serving both farmer and sportsman.

Abundant proof is at hand to show that the red-tail greatly prefers the smaller mammals, reptiles, and batrachians, taking little else when these can be obtained in sufficient numbers. If hard pressed by hunger, however, it will eat any form of life and will not reject even offal and carrion; dead crows from about the roosts, poultry which has been thrown on the compost heap, and flesh from the carcasses of goats, sheep, and the larger domesticated animals being eaten at such times. The immature birds are more apt to commit depredations, the reason probably being that they lack skill to procure a sufficient quantity of their staple food. A large proportion of the birds captured consists of ground-dwelling species, which are probably snatched up while half concealed in the grass or other vegetation. Among the mammals most often eaten and most injurious to mankind are the arboreal and ground squirrels, rabbits, voles and other mice. The stomachs of the red-tailed hawks examined contained Abert's squirrel, red squirrel, three species of gray squirrels, two species of chipmunks, Say's ground squirrel, plateau ground squirrel, Franklin's ground squirrel, striped ground squirrel, harvest mouse, common rat, house mouse, white-footed mouse, Sonoran white-footed mouse, wood rat, meadow mouse, pine mouse, Cooper's lemming mouse, cotton rat, jumping mouse, porcupine, jack rabbit, three races of cottontails, pouched gopher, kangaroo rat, skunk, mole, and four kinds of shrews. The larger insects, such as grasshoppers, crickets, and beetles, are sometimes extensively used as food.

The *red-shouldered hawk*, or, as it is sometimes incorrectly called, the "hen hawk," is a common bird, and a very valuable one to the farmer. It is more omnivorous than most of our birds of prey, and has been detected feeding on mice, birds, snakes, frogs, fish, grasshoppers, centipedes, spiders, crawfish, earthworms, and snails. As about 90 per cent of its food consists of injurious mammals and insects, and hardly 1½ per cent of poultry and game, the reader may draw his own conclusions as to the appropriateness of the title "hen hawk," so often misapplied to this species. A pair of these hawks bred for successive years within a few hundred yards of a poultry farm containing 800 young chickens and 400 ducks, and the owner never saw them attempt to catch a fowl. Besides mice, squirrels, shrews, and insects, which form their principal food, frogs, snakes, and crawfish are also taken.

Such facts as these must convince intelligent persons not only that it is folly to destroy this valuable bird, but that it should be everywhere fostered and protected.

The food of *Swainson's hawk* (fig. 21) is of much the same character as that of the two preceding species, except that more insects and fewer birds are taken. Soon after the breeding season the hawks collect in the foothills and on the plains of the West, forming flocks, some of which contain hundreds of individuals, and feed almost exclusively on grasshoppers and crickets. If we assume that 100 grasshoppers, which is only three-quarters of the number actually found in a stomach after a single meal, is the daily allowance for one hawk, we have a grand total of 900,000 for the work of a flock of 300 birds in one month. The weight of this vast number of insects, allowing 15.4 grains for the weight of each, amounts to 1,984 pounds. An average of a number of estimates given by entomologists places the quantity of food daily devoured by a grasshopper as equal to his own weight; consequently if these grasshoppers had been spared by the hawks the farmer would have lost in one month nearly 30 tons of produce. The above estimate is probably much too low; for each hawk doubtless eats at least 200 grasshoppers daily, which would double the amount, making the loss 60 tons instead of 30. This is the work of a month for only 300 hawks. What estimate can be placed on the services of the hundreds of thousands which are engaged in the same work for months at a time? In many places hawks are all that are left of the mighty army which once waged war against these insect pests and so kept them in check. The game birds, such as the wild turkey, prairie chicken, grouse, and quail, have been swept away by the ruthless hand of man, and even the skunks, foxes, and snakes are rapidly following. To make matters worse, at least one Western State passed a bounty act which paid for the destruction of hawks and owls, as a result of which thousands of grasshopper-eating hawks were destroyed at the public expense. Is it a wonder that after their enemies were reduced to a minimum the grasshoppers increased and spread destruction before them?

All naturalists who have written on the habits of *Swainson's hawk* affirm that it is a great enemy to the ground squirrel and other injurious rodents which infest the West and torment the farmer. The evidence shows that it rarely touches poultry, game, or small birds. In the Southwest the writer has often seen the nests of small birds in the same trees and in close proximity to the nests of the hawks, the birds apparently living in perfect harmony. Other observers have noticed the same thing.

The *broad-winged hawk*, a medium-sized species, common throughout the eastern United States, feeds largely on insects, small mammals, snakes, toads, and frogs, and occasionally on small birds. It is especially fond of the larvæ or caterpillars of the large moths which feed upon the leaves of fruit and shade trees. These insects are too large and formidable for the smaller insectivorous birds to attack; hence their principal enemies are the hawks, of which the one under consideration is the most important. It also feeds extensively upon grass-

hoppers, crickets, cicadae, May beetles and other coleoptera. Like the other buzzard hawks (*Buteo*), it is fond of meadow mice, and also takes considerable numbers of chipmunks, shrews, red squirrels, and occasionally rabbits and moles. Probably the greatest damage done by this hawk is the destruction of toads and snakes, which are mainly insectivorous and hence beneficial to the farmer.

The *sparrow hawk*, which is found throughout the United States, is the smallest and handsomest of our birds of prey, and, with the possible exception of the red-tail, the best known. It is the only one of the true falcons which can be placed in the "mainly beneficial" class. At times it follows the example of its larger relatives and attacks small birds and young chickens, but these irregularities are so infrequent that they are more than outweighed by its usual good services in destroying insects and mice. Grasshoppers, crickets, and other insects form its principal food during the warm months, while mice predominate during the rest of the year. In localities where these insects are abundant it congregates, often in moderate-sized bands, and feeds almost continuously on them. Terrestrial caterpillars, beetles, and spiders are also eaten to a considerable extent. As might be expected, a very large proportion of the birds captured is taken while the hawks are busy hatching their eggs and rearing the young, thus having less time to procure their favorite food. It is also at this time that we hear complaints of their depredations in poultry yards. During the late fall and winter months the meadow mice and house mice form a large part of their food, the former being taken in the fields and meadows, and the latter around the corn stacks and about the barns and out-buildings. On account of the sparrow hawk's confidence and lack of fear, it is one of the species which suffers most from the unjust bounty laws. Any vandal who can carry a gun is able to slaughter this little hawk. Mr. W. B. Hall, of Wakeman, Ohio, writes us that while the hawk law was in force in Ohio he was township clerk in his native village and issued 86 certificates, 46 being for sparrow hawks. He examined the stomachs and found 45 of them to contain the remains of grasshoppers and beetles, while the remaining one contained the fur and bones of a meadow mouse. Mr. H. W. Henshaw, visiting Colorado in 1883, after the bounty act had been in force for some time, found that the sparrow hawks had been almost exterminated in districts where several years before he had found them exceedingly numerous.

It is a question whether the slightly harmful owls should not be placed among the wholly beneficial species, for the injury done in destroying birds and poultry is insignificant compared with their good work. The *barn owl* is a southern species, rarely occurring with regularity in the northern half of the United States except west of the Sierra Nevada. Its food is made up almost entirely of mammals, with now and then a few insects, and occasionally a bird. Among the former are several species of rodents which, from their great numbers



and destructive habits, are a curse to the country they inhabit. Of this group the pouched gopher is one of the most destructive, not only to vegetables and grain crops but also to shade and fruit trees. The injuries to trees are the most serious, as the animals sometimes gnaw off the roots and destroy entire groves and orchards. In California, where this mammal is common, the barn owl feeds very extensively on it. In the South Atlantic and Gulf States the owl feeds extensively on the cotton rat, a mammal of destructive habits found abundantly in the bottom lands and near water. The common rat is also greedily devoured. The writer has examined the contents of 200 pellets taken from the nesting site of a pair of these owls in one of the towers of the Smithsonian Institution. Of the total of 454 skulls contained in these pellets there were 225 meadow mice, 2 pine mice, 179 house mice, 20 rats, 6 jumping mice, 20 shrews, 1 star-nosed mole, and 1 vesper sparrow. This examination gives a pretty complete index to the class of food taken by this species in the East, along the northern border of its range.

The *long-eared owl* is an industrious mouser, and molests comparatively few birds. Several years ago we examined 107 stomachs of this owl, of which 15 were empty. Of the 92 remaining, 86, or over 93 per cent, contained the remains of small mammals. As the bird occurs in suitable localities all over the United States and is one of the commonest owls, the good it does must be very great. Like the sparrow hawk, this owl is easily destroyed, and so is one of the greatest sufferers when laws are enacted for the destruction of birds of prey, and many a bounty has been paid for its head.

The *short-eared owl* is another common species, but is not so well distributed as the preceding. It is found in more open country, and in fall and winter often congregates in large bands about meadow lands and the larger marshes. Fully 75 per cent of its food consists of mice; as many as six of these mammals have been found in one stomach. It probably also feeds on the smaller ground squirrels in the West, but we have been unable to procure much positive data on the subject. Among birds, the sparrows inhabiting the meadows and prairies are most often taken. In an interesting article by Mr. Peter Adair, in the *Annals of Scottish Natural History* for October, 1893, on the disappearance of the short-tailed vole, which caused the vole plague in Scotland in 1890-1892, the statement is made that farmers and shepherds attribute its disappearance largely to the action of its natural enemies, stress being laid on the services of the owl, kestrel, rook, and black-headed gull among birds and the stoat and weasel among mammals. These men are also of the opinion that the recent vole plague is a result of the destruction of birds of prey. When the plague first commenced the short-eared owl was hardly known in the district, but, swarming thither, it bred till it was so numerous that it became an important factor in reducing the number of voles. In speaking of an enemy of the



RED-TAILED HAWK (*BUTEO BOREALIS*).





SPARROW HAWK (*FALCO SPARVERIUS*).



owl, Mr. Adair recorded an interesting fact. A fox which had acquired a taste for lamb had to be disposed of. In the lair with its 5 young were found 76 dead short-eared owls, a number of grouse, black game, partridges, ducks, curlew, plover, rats, voles, and lambs. This was in May, and of this great number of owls 8 were adults and 68 were young. During a number of vole invasions of Great Britain in previous years short-eared owls had been observed to increase rapidly and do good work in destroying the pests.

The *barred owl* is one of the larger common species in eastern North America. It has the reputation, especially among the older writers, of being very destructive to poultry. Our examination of 100 stomachs shows that about 4½ per cent of its food consists of poultry and game. Half-grown fowls which roost among the trees and bushes away from the farmyards are the ones that suffer. If the chickens were shut up in the yard at night the owl would not be tempted to depart from its regular diet. The barred owl is more given to cannibalistic habits than any of the other species. Of 109 stomachs which passed under the writer's notice, 7 contained the remains of smaller owls. Numerous accounts of similar instances have appeared in various journals. Insects, such as grasshoppers, crickets, May beetles and other coleoptera, are frequently taken. In some localities crawfish form a considerable portion of this owl's food, and frogs and fish are occasionally taken. The majority of its food, however, consists of small mammals, among them some of the most destructive rodents the farmer has to contend with. The following list shows the species of mammals positively identified in the stomach contents: Meadow mouse, pine mouse, short-tailed shrew, chipmunk, red squirrel, flying squirrel, cottontail rabbit, golden mouse, white-footed mouse, red-backed mouse, common mole, Cooper's lemming mouse, and common rat. In summing up the facts relative to the food habits of this owl, it appears that although it occasionally makes inroads upon poultry and game, it destroys large numbers of injurious mammals and insects, and hence should occupy a place on the list of birds to be protected.

The little *screech owl* is well known throughout the greater part of the United States. With the exception of the *burrowing owl*, it feeds more extensively on insects than any of the other species. It is also a diligent mouser, and feeds more or less frequently on crawfish, frogs, toads, scorpions, lizards, and fish. Of 254 stomachs examined, birds were found in about 15 per cent. Fully one-third of these consisted of English sparrows, and a large proportion of the rest were ground-dwelling sparrows, which feed largely on seeds and are of little economic importance. Among insects, grasshoppers, crickets, beetles, and cutworms are most often eaten. As many as 50 grasshoppers have been found in one stomach, 18 May beetles in another, and 13 cutworms in a third. During the warmer parts of the year it is exceptional to find a stomach not well filled with insect remains. Meadow mice, white-

footed mice, and house mice are the mammals most often taken, while chipmunks, wood rats, flying squirrels, and moles are less frequently found. The screech owl is fond of fish and it apparently catches many, especially in winter. At this time it watches near the breathing holes in the ice, and seizes the luckless fish which comes to the surface. Most of the birds destroyed by this owl are killed either in severe winter weather or during the breeding season, when it has hard work to feed its young. As nearly three-fourths of the owl's food consists of injurious mammals and insects, and only about one-seventh of birds (a large proportion of which are destructive English sparrows), there is no question that this little owl should be carefully protected.

The *snowy owl* is a large arctic species which in winter occasionally occurs in considerable numbers in the United States. On account of



FIG. 22.—Burrowing Owl (*Speotyto cunicularia hypogaea*).

its large size it is capable of doing great good in destroying noxious mammals. The stomachs which we have examined were collected between the last of October and March, and make a very good showing for the bird. Although a number of water birds were found, a large proportion of the contents consisted of mammal remains. One stomach contained 14 white-footed mice and 3 meadow mice, and in others as many as 5 to 8 of these little rodents were found. The common rat occurred in a number of stomachs and appears to be considerably sought after. It is a lamentable fact that this useful bird is slaughtered in great numbers whenever it appears within our limits. According to Mr. Ruthven Deane, as many as 500 were killed in New England during the winter of 1876-77.

Although the little *burrowing owl* is preeminently an insect-eating bird, it also feeds on small mammals and rarely on birds. It is common throughout the plains of the West, where it is usually a permanent resident. During the warmer months it feeds almost exclusively on insects and scorpions, and at other times on small mammals. In regard to its habit of eating scorpions, Mr. George H. Wyman, of St. George, Utah, states, in *Forest and Stream* for March 3, 1887, that during the summer the owl comes quietly about the house at dusk and picks up the scorpions by scores. Usually it has a place near by where it retreats to eat such portions as are desired. It devours the soft parts of the scorpion, leaving the head, claws, and tail, until a quart or more of such remnants may be found at the place of banquet. Among insects, grasshoppers, crickets, beetles, and caterpillars are taken in large quantities, and the birds may be seen pursuing the more agile species even at mid-day. The *burrowing owl* (fig. 22) is a beautiful, harmless bird, and should be protected by law.

The golden eagle, bald eagle, pigeon hawk, Richardson's hawk, Aplomado falcon, prairie falcon, and great horned owl belong to the third class, which includes those whose beneficial and noxious qualities about balance each other. Still at times any one of them may become decidedly beneficial in localities infested by some of the numerous rodents which injure crops. The *golden eagle*, an inhabitant of the Northern Hemisphere, is found in most parts of the United States, though it is more common in the West. The food consists of game, such as fawns, rabbits, woodchucks, prairie dogs, and ground squirrels, among mammals, and turkeys, grouse, and waterfowl, among birds. At times it also troubles the young of domesticated animals, notably lambs, pigs, goats, and poultry. It has been known to attack calves and colts, but these instances must be exceptional and when the birds are hard pressed by hunger. Over extensive areas of the West the golden eagle and other birds of prey unite in keeping many species of noxious rodents in check, and must be considered beneficial. In the more thickly inhabited regions, however, where such food is scarce, they often do great damage by carrying off lambs, young pigs, kids, and poultry. As many as four hundred lambs are reported to have been taken from contiguous ranges in one season. It thus will be seen that in one instance the bird should be protected, and in the other kept in check.

The *bald eagle*, the emblem of our country, is found in suitable localities throughout the United States, though it is more common near large bodies of water than elsewhere. Its favorite food is fish, and when they can be obtained either by capture or in the shape of offal it will touch little else. A considerable proportion of the fish secured is taken from the osprey or fishhawk; still the eagle is fully capable of fishing for itself when necessity demands. Where fish are scarce or for any reason hard to procure, it will feed on waterfowl from the size



of large swans down to the smaller ducks and coots. Like the golden eagle, it preys on many of the destructive rodents in the West and is there considered a beneficial bird. Unfortunately, it is fond of lambs, pigs, and poultry, and probably does as much damage as the golden eagle in the more thickly inhabited regions. A great deal of sensational matter has appeared from time to time in the various newspapers about eagles attacking and carrying off children. Few of these stories



FIG. 21.—Great Horned Owl (*Bubo virginianus*).

have any foundation in truth, though in olden times, when eagles had less fear of man, they may have picked up an unguarded infant.

The *pigeon hawk*, *Richardson's hawk*, and *Aplomado falcon* are all true falcons. Though they feed on the flesh of birds, they destroy enough insects and noxious mammals to partially offset the injury they do. The *prairie falcon* inhabits the dry Western plains and neighboring mountains, in the cliffs of which it builds its nest. Throughout a large portion of the country inhabited by this species, poultry is scarce, as most of the ranchers do not yet attempt to raise it. Although this

falcon feeds extensively upon waterfowl, quail, prairie chickens, and other game, it also attacks various kinds of injurious mammals, notably the smaller ground squirrels, such as the striped, Franklin's, Richardson's, Harris's, and the allied species, which abound in many sections of the country included in its range. In this respect it is of considerable service to the agriculturist, and probably offsets the injury done by destroying game; but, unfortunately, the data at hand are insufficient to show just how extensively it preys on these animals; hence the benefit done can not be correctly estimated.

One or other of the races of the large and handsome *great horned owl* is found throughout the United States where suitable timber exists for its habitation. It is a voracious bird, and its capacity for good or evil is very great. If we could pass over the more thickly settled districts where poultry is extensively raised and see the bird only as it appears in the great West, we would give it a secure place among the beneficial species, for it is an important ally of the ranchman in fighting the hordes of ground squirrels, gophers, prairie dogs, rabbits, and other rodents which infest his fields and ranges. Where mammals are plenty it does not seem to attack poultry or game birds to any considerable extent, but in regions where rabbits and squirrels are scarce it frequently makes inroads among fowls, especially where they are allowed to roost in trees. Undoubtedly rabbits are its favorite food, though in some places the common rat is killed in great numbers; we have one record of the remains of over one hundred rats that were found under one nest. The following is a list of the mammals we have found in the stomachs examined: Three species of rabbits, cotton rat, two species of pouched gophers, two species of wood rats, chipmunk, two species of grasshopper mice, white-footed mouse, plateau ground squirrel, Harris's ground squirrel, muskrat, fox squirrel, five species of meadow mice, one short-tailed shrew, the house mouse, common rat, black bat, red-backed mouse, flying squirrel, shrew, and kangaroo rat. Besides mammals and birds, insects (such as grasshoppers and beetles), scorpions, crawfish, and fish are also taken. The great horned owl (fig. 23) does a vast amount of good, and if the farmers could be induced to shut up their chickens at night instead of allowing them to seek shelter in trees and other exposed places, the principal damage done by the bird would be prevented and the beneficial effects increased accordingly.

#### HARMFUL HAWKS AND OWLS.

We come now to the fourth class, the species of which are harmful, feeding, to a marked degree, on poultry and wild birds. In olden times, when falconry was a fashionable pastime, there were two types of hawks, each of which had its devotees. One, the true falcon, represented by the large gyrfalcon and the peregrine falcon, captured their quarry by superior power of flight in open country; while the other, the accipi-

trine hawks, represented by the goshawk, although strong fliers, succeeded in capture less by long flights than by short rapid dashes or by skillfully turning upon its unsuspecting prey. In the United States the injurious hawks belong to these two classes and are represented by closely allied species. The gyrfalcon and duck hawk are true falcons; while the goshawk, sharp-shinned, and Cooper's hawk are accipitrines. The gyrfalcons will not be considered, as they are northern species which very rarely enter the United States. The duck hawk also is so



FIG. 21.—Cooper's Hawk (*Accipiter cooperi*).

uncommon, except about large bodies of water, that it plays an unimportant part in depredations upon poultry and upland game birds. During the migration of waterfowl along the seacoast, estuaries, large rivers, and lakes, the duck hawk has an abundant supply of food, feeding upon ducks, coots, waders, and even at times on gulls and terns. It is only during the breeding season that this falcon is ever troublesome to the farmer. An isolated pair may nest among the cliffs or in the giant trees of river bottoms near enough the agricultural districts to make daily inroads upon the farmyard. These cases are uncom-

mon, however, and usually by patient watching the robber can be captured before much harm is done.

One may find in the group of hawks embracing the goshawk, Cooper's hawk, and sharp-shinned hawk the probable cause for the unjust hatred and suspicion with which our birds of prey, as a whole, are held. All three species feed very largely upon the flesh of birds, of which game and poultry form a considerable part. As above mentioned, they capture their prey not so much by swift, long-continued flight in the open as by quick turns and rapid dashes from cover, the victim being grasped before the hawk's presence is really suspected. Fortunately, the *goshawk*, the largest of the three, is a northern species, and consequently is rare in most parts of the United States, except in fall and winter. It is a large, powerful bird, easily killing and carrying off a full-grown fowl, ruffed grouse, or hare. Many are the accounts told of its audacity in attacking poultry, taking it almost from under the very feet of the owner, and even entering inhabited houses in pursuit of its intended victim. It also has been known even to attack a person. A case of this kind happened to Dr. C. Hart Merriam, in northern New York. While in pursuit of a warbler with a small 22-caliber rifle, loaded with a light charge of dust shot, he heard a hen cry out in distress from behind a pile of stones. Guided by the sound, he soon reached the spot, and found a goshawk perched upon an old hen, not more than 10 feet distant. Aiming at its breast, he fired, but with no other effect than to arouse its wrath, for it immediately darted at his head with great fury. He struck at the hawk while on the wing and loosened a tail feather, but failed to knock it down. Meanwhile, the hen was making off, so, leaving the doctor, the hawk gave chase. She ran into some bushes which were so thick that the hawk could not fly between them, when, closing its wings and dropping to the ground, it followed in a succession of long, rapid hops, and quickly overtook her and pounced upon her back. She ran, carrying the hawk for nearly 100 feet. The doctor soon caught up and struck at the hawk with his empty gun, which it dodged by dropping on its back, after which it escaped to a neighboring tree and flew off. From the persistency with which this species hunts the ruffed grouse in many of the Northern States, it has received the name "partridge hawk." Mammals from the size of a full-grown hare down to the smaller mice are also captured, and it is stated that in the far north it feeds largely on lemmings.

*Cooper's hawk* is preeminently a "chicken hawk," and is by far the most destructive species we have to contend with, not because it is individually worse than the goshawk, but because it is so much more numerous that the aggregate damage done far exceeds that of all other birds of prey. Although not so large as the goshawk, it is strong enough to carry away a good-sized chicken, grouse, or cottontail rabbit. It is especially fond of domesticated doves, and when it finds a cote easy to approach without being observed, or near its retreat or

